1   **1.** (originally presented) A database management system having the improvement comprising:

2   bitmap values, a bitmap value having a representation of a bitstring wherein set bits

3   specify a set of objects whose definitions are built into the database management system, and

4   user-accessible operations on the bitmap values.

1   **2.** (originally presented) The database management system set forth in claim 1 wherein the

2   user-accessible operations comprise at least:

3   a set-to-bitmap operation wherein a bitmap value is derived from a given set of the

4   objects.

1   **3.** (originally presented) The database management system set forth in claim 2 wherein:

2   the derived bitmap value is a new bitmap value that specifies the objects in the given

3   set.

1   **4.** (originally presented) The database management system set forth in claim 2 wherein:

2   the derived bitmap value is a preexisting bitmap value which now further specifies the

3   objects in the given set.

1   **5.** (originally presented) The database management system set forth in claim 2 wherein:

2   the derived bitmap value is a preexisting bitmap value which now no longer

3   specifies any objects in the given set.

1   **6.** (originally presented) The database management system set forth in claim 1 wherein the

2   user-accessible operations comprise at least:

3   a bitmap-to-set operation wherein the set of the objects specified in a given bitmap

4   value is derived from the given bitmap value.

1   **7.** (originally presented) The database management system set forth in claim 1 wherein the

2   user-accessible operations comprise at least:

3   a bitmap-to-count operation wherein the number of the objects in the set specified in a

4   given bitmap value is derived from the given bitmap value.

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1   **8.** (originally presented) The database management system set forth in claim 1 wherein the

2   user-accessible operations comprise at least:

3   an existence operation wherein a value representing the logical value TRUE is returned

4   when a given object belongs to the set of the objects represented by a given bitmap value.

1   **9.** (originally presented) The database management system set forth in claim 1 wherein the

2   user-accessible operations comprise at least:

3   a logical operation on a first bitstring represented by a first bitmap value and a second

4   bitstring represented by a second bitmap value.

1   **10.** (originally presented) The database management system set forth in claim 1 wherein the

2   user-accessible operations comprise at least:

3   a comparison operation on a first bitmap value and a second bitmap value wherein a

4   value representing the logical value TRUE is returned when the first bitmap value and the

5   second bitmap value specify the same set of the objects.

1   **11.** (originally presented) The database management system set forth in claim 1 wherein:

2   the bitmap values include settable bitmap values; and

3   the user-accessible operations comprise at least an assignment operation which sets a

4   target settable bitmap value from a source bitmap value.

1   **12.** (originally presented) The database management system set forth in claim 1 wherein:

2   the bitmap values include bitmap values that are persistent in the database management

3   system.

1   **13.** (originally presented) The database management system set forth in claim 12 wherein:

2   the persistent bitmap values include bitmap values in fields of tables of the database

3   management system.

1   **14.** (originally presented) The database management system set forth in claim 1 wherein:

2   the bitstring is compressed.

3

1   **15.** (originally presented) The database management system set forth in claim 1 wherein:

2   the objects are identifiers for other objects that exist in the database management

3   system.

1   **16.** (originally presented) The database management system set forth in claim 15 wherein:

2   the identifiers for the other objects are row identifiers of rows in the database

3   management system.

1   **17.** (originally presented) The database management system set forth in claim 16 wherein:

2   the row identifiers are row identifiers returned by a user-defined query executed in the

3   database management system.

1   **18.** (originally presented) The database management system set forth in claim 17 wherein:

2   the query returns a row identifier when a field in the row has an attribute specified in

3   the query,

4   whereby the bitmap value represents the set of fields having the specified attribute.

1   **19.** (originally presented) The database management system set forth in claim 1 wherein:

2   the objects are identifiers for other objects that exist outside the database management

3   system.

1   **20.** (originally presented) The database management system set forth in claim 19 wherein:

2   the identifiers for objects that exist outside the database management system are

3   electronic product codes for product items.

1   **21.** (originally presented) A data storage device, the data storage device being characterized in

2   that:

3   the data storage device contains code which, when executed in a computer system,

4   implements the database management system set forth in claim 1.

1   **22.** (originally presented) A bitmap value employed in a database management system, the

2   bitmap value representing a first set of first objects, the first objects being external to the

4

3   database management system and members of the first set being mapped onto a members of a

4   second set of second objects that is defined in the database management system, and

5   the bitmap value comprising:

6   a mapping specifier that maps a string of bits to a subset of the second set; and

7   a representation of the string of bits wherein a bit is set in the represented string of bits

8   when the member of the second set that is mapped to the bit has a member of the first set

9   mapped thereto.

1   **23.**   (originally presented) The bitmap value set forth in claim 22 wherein:

2   the second set is ordered.

1   **24.** (originally presented) The bitmap value set forth in claim 23 wherein:

2   the order of the members of the second ordered set corresponds to values of the

3   members thereof;

4   the mapping specifier specifies the mapping by specifying one or more ranges of the

5   values of the members of the second ordered set to which the string of bits is mapped; and

6   the representation of the string of bits represents strings of bits corresponding to the

7   ranges.

1   **25.** (originally presented) The bitmap value set forth in claim 24 wherein:

2   the mapping specifier specifies the range of the values by specifying a start value and

3   an end value.

1   **26.**   (originally presented) The bitmap value set forth in claim 24 wherein:

2   the values include a prefix which determines a range of the values; and

3   the mapping specifier specifies the range of the values by specifying the prefix for the

4   range.

1   **27.** (originally presented) The bitmap value set forth in claim 26 wherein:

2   the mapping specifier further specifies the range of the values by using a start value and

3   an end value to specify one or more subranges of the range specified by the prefix.

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1   **28.** (originally presented) The bitmap value set forth in claim 24 wherein:

2   the objects in the second ordered set are identifiers for objects in the first set.

1   **29.** (originally presented) The bitmap value set forth in claim 28 wherein:

2   the identifiers for objects in the first set are electronic product codes for the objects

1   **30.** (originally presented) The bitmap value set forth in claim 22 wherein:

2   there is a plurality of the bitmap values in the database management system; and

3   certain of the bitmap values are persistent in the database management system.

1   **31.** (originally presented) The bitmap values set forth in claim 30 wherein:

2   the persistent bitmap values include bitmap values in fields of tables of the database

3   management system.

1   **32.** (originally presented) The bitmap value set forth in claim 22 wherein:

2   the representation of the bitstring is a compressed representation thereof.

1   **33.** (originally presented) The bitmap value set forth in claim 22 wherein:

2   there is a plurality of the bitmap values in the database management system; and

3   the database management system provides a plurality of user-accessible operations on

4   the bitmap values.

1   **34.** (originally presented) The bitmap value set forth in claim 33 wherein:

2   certain of the user-accessible operations alter the range specifier and the representation

3   of the bitstring as required to map the represented string of bits to a subset of the second set

4   that is required for the operation.

1   **35.** (originally presented) A data storage device, the data storage device being characterized in

2   that:

3   the data storage device contains code which, when executed in a computer system,

4   implements the bitmap value set forth in claim 22.

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1   **36.** (originally presented) A method employed in a database system of making a bitmap value

2   that represents a first set of objects external to the database system,

3   the method comprising the steps performed in the database system of:

4   mapping the objects onto a second ordered set of identifiers defined in the database

5   management system;

6   mapping a bitstring that is represented in the bitmap value onto a subset of the second

7   set that includes the identifiers onto which the objects have been mapped; and

8   setting the bits in the bitstring that correspond to the identifiers onto which the objects

9   have been mapped.

1   **37.** (originally presented) The method set forth in claim 36 wherein:

2   in the step of mapping the objects, the identifiers in the second set are identical with

3   identifiers that are employed externally to the database system to identify the objects.

1   **38.** (originally presented) The method set forth in claim 37 wherein:

2   in the second set, the identifiers are electronic product codes.

1   **39.** (originally presented) The method set forth in claim 36 wherein the step of mapping a

2   bitstring comprises the steps of:

3   making a range specifier that specifies a range of the ordered set of identifiers that

4   includes the identifiers into which the objects have been mapped; and

5   mapping the bits in the bitstring to the specified range.

1   **40.** (originally presented) The method set forth in claim 39 wherein the step of making a range

2   specifier includes the step of:

3   making a start value and an end value which together specify the range.

1   **41.** (originally presented) The method set forth in claim 39 wherein the step of making a range

2   specifier includes the step of

3   making a prefix value which specifies the range.

1   **42.** (originally presented) The method set forth in claim 36 further comprising the step of:

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2 compressing the bitstring.

1 **43.** (originally presented) A data storage device, the data storage device being characterized in
2 that:
3 the data storage device contains code which, when executed in a computer system,
4 implements the method set forth in claim 36.

1 **44.** (originally presented) A bitmap value employed in a database management system to
2 represent a first subset of the row identifiers defined in the database management system,
3 the bitmap value comprising:
4 a mapping specifier that maps a string of bits to a second subset of the set of row
5 identifiers; and
6 a representation of the string of bits wherein a bit is set in the represented string of bits
7 when the member of the second subset that is mapped to the bit corresponds to a member of
8 the first subset; and
9 the first subset is returned by a user-defined query executed by the database
10 management system

1 **45.** (originally presented) The bitmap value set forth in claim 44 wherein:
2 the database management system dynamically alters the mapping specifier and the
3 representation of the string of bits as required to map the representation of the string of bits to a
4 second subset of the row identifiers that includes the first subset of the row identifiers.

1 **46.** (originally presented) The bitmap value set forth in claim 44 wherein:
2 the query returns a row identifier when a field in the row identified by the row identifier
3 has an attribute specified in the query,
4 whereby the bitmap value represents the set of fields whose values have the specified attribute.

1 **47.** (originally presented) A data storage device, the data storage device being characterized in
2 that:
3 the data storage device contains code which, when executed in a computer system,
4 implements the method set forth in claim 44.

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1　　**48. (Canceled)**

1　　**49. (Canceled)**

1　　**50. (Canceled)**

1　　**51. (Canceled)**

1　　**52. (Canceled)**

1　　**53. (Canceled)**

1　　**54. (Canceled)**

1　　**55. (Canceled)**

1　　**56. (Canceled)**

1　　**57. (Canceled)**

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